(STRUCTURAL& GEOMETRICAL)

ISOMERISM

EXERCISE # I (MAINS ORIENTED)

Single Correct Type :

1. Minimum number of carbon atom required by a Hydrocarbon alkane, alkene and alkyne to show chain isomerism respectively are :

(A) 4, 4, 4 (B) 4, 3, 3 (C) 4, 4, 3 (D) 4, 4, 5

2. C_7H_7Cl shows how many benzenoid aromatic isomers ?

(A) 4 (B) 3 (C) 5 (D) 6

3. How many structural isomers of primary amines are possible for the formula $C_4H_{11}N$?

(A) 2 (B) 3 (C) 4 (D) 5

4. How many benzenoid structure are possible for molecular form C_7H_8O :

(A) 3 (B) 4 (C) 5 (D) 6

5. Which of the following compound give geometrical isomerism ?

(A) CH_2Cl_2 (B) $CH_2Cl—CH_2Cl$ (C) $CHBr = CHCl$ (D) $CH_2Cl—CH_2Br$.

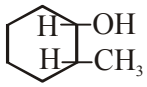
6. Maximum potential energy is associated with which of the following conformers of n-butane :

(A) Anti (B) Gauche (C) Eclipsed (D) Partial eclipsed

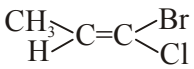
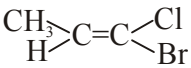
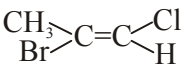
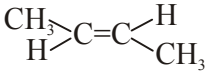
7. Which among the following compounds will show geometrical isomerism :

(A) $CH_3–CH=CH_2$ (B) $CH_3–\underset{\displaystyle CH_3}{\overset{\displaystyle |}{C}}=CH_2$ (C) $CH_3–\underset{\displaystyle CH_3}{\overset{\displaystyle |}{C}}=CHD$ (D) $CH_3–CH=CHD$

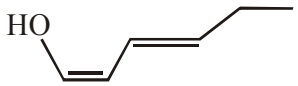
8. Which among the following will show geometrical isomerism :

(A) (B)  (C) $C_6H_5–CH=N–OH$ (D) All of these

9. Which one of the following is Z isomer :

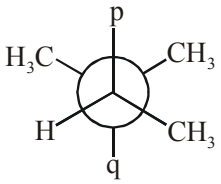
(A)  (B)  (C)  (D) 

10. The correct stereochemical descriptions for the structure given below are :



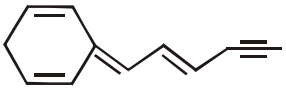
(A) 1 Z, 3Z (B) 1Z, 3E (C) 1E, 3E (D) 1E, 3Z

11. What is the value of p & q of following conformer of 2,3-dimethyl butane ?



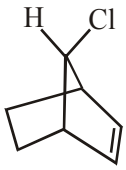
(A) p = H, q = H (B) p = CH_3, q = CH_3 (C) p = CH_3, q = H (D) p = H, q = CH_3

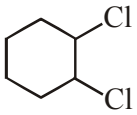
12. The number of cis-trans isomer possible for the following compound.

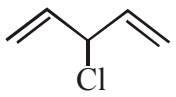


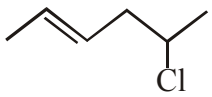
(A) 2 (B) 4 (C) 6 (D) 8

13. Which of the following can not show geometrical isomerism :

(A) 

(B) 

(C) 

(D) 

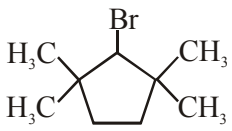
14. How many structural formula are possible when one of the hydrogen is replaced by a chlorine atom in benzene & naphthalene respectively ?

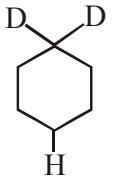
(A) 1, 1 (B) 1,2 (C) 2, 2 (D) 2, 1

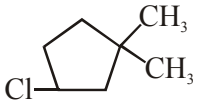
15. The number of structural isomers of C_5H_{10} is :-

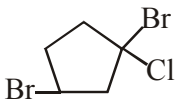
(A) 10 (B) 11 (C) 12 (D) 13

16. Which of the following compounds will show geometrical isomerism.

(A) 

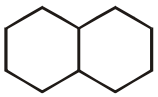
(B) 

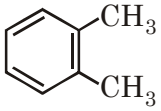
(C) 

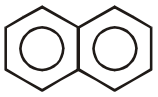
(D) 

17. Which of the following will show geometrical isomerism?

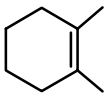
(A) Benzene

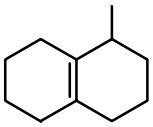
(B)  Decalin

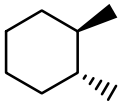
(C)  o–Xylene

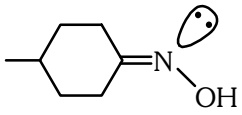
(D)  Naphthalene

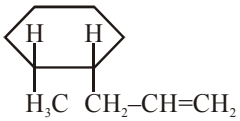
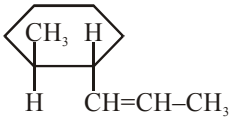
18. Which of the following cannot be represent in E or Z

(A) 

(B) 

(C) 

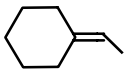
(D) 

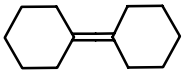
19. 


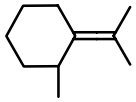
(A) Geometrical isomer (B) Ring chain isomer

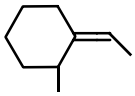
(C) Position isomer (D) Chain isomer

20. Which of the following can show geometrical isomesrism :

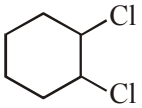
(A) 

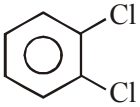
(B) 

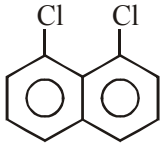
(C) 

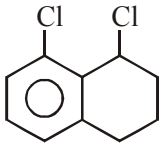
(D) 

21. Which of the following will show Geometrical isomerism.

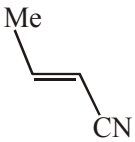
(A) 

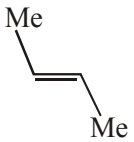
(B) 

(C) 

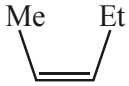
(D) 

22. Which of the following will have lowest dipole moment?

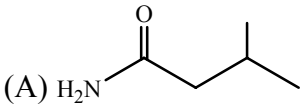
(A) 

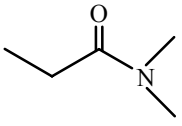
(B) 

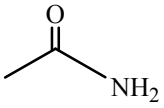
(C)

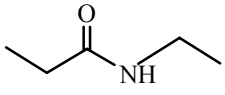
(D) 

23. Which of the following compounds can show geometrical isomerism in its resonating structure.

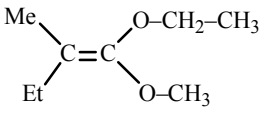
(A) 

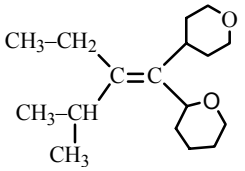
(B) 

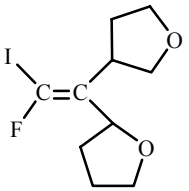
(C) 

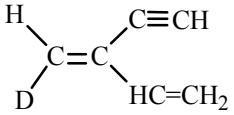
(D) 

24. Which of the following represent Z-isomer ?

(A) 

(B) 

(C) 

(D) 

25. Which of the following statement is not correct :-

(A) Cyclobutane is a planar compound

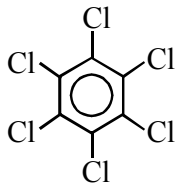
(B) Trans cyclohexadecene is relatively more stable than its cis form

(C) Cis form of 1,3,5-trimethylclohexane is relatively more stable than its trans form

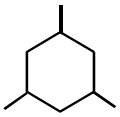
(D) Cis 1,2-dichloroethene is relatively more stable than its trans form.

26. Select which one of the following can not show geometrical isomerism

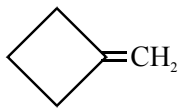
(A)

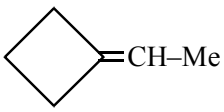
(B) 

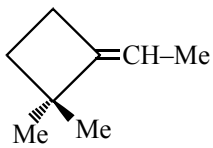
(C) Me–CH = C = C = CH – Me

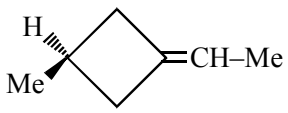
(D) 

27. Which one of the following is capable of showing geometrical isomerism.

(A) 

(B) 

(C) 

(D) 

More than one correct Type :

28. Which of the following statements is/are not correct :

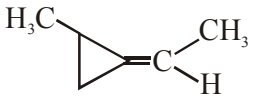
(A) Metamerism belongs to the category of structural isomerism

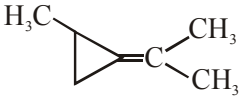
(B) Tautomeric structures are the resonating structures of a molecule

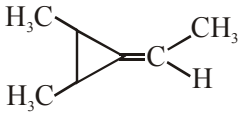
(C) Keto form is always more stable than the enol form

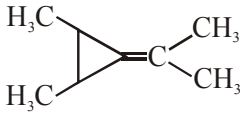
(D) Geometrical isomerism is shown only by alkenes

29. Which of the following will show geometrical isomerism :

(A) 

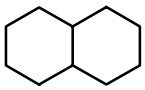
(B) 

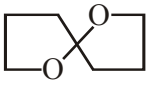
(C) 

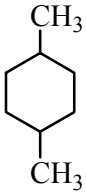
(D) 

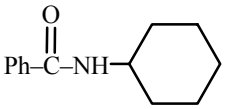
30. Which of the following compound will shows geometrical isomerism ?

(A) Ph –CH =N –Me

(B) 

(C) 

(D) 

31 

(A) This molecule shows geometrical isomerism.

(B) One of the resonating structure of this molecule shows geometrical isomerism

(C) One of the tautomer of this molecule shows geometrical isomerism

(D) In acidic medium this molecule shows geometrical isomerism.

Assertion / Reasoning Type :

32. **Statement-1 :** All double bond containing compounds show geometrical isomerism.

and

Statement-2 : Alkenes have restricted rotation about the carbon-carbon double bond.

(A) Statement-1 is True, Statement-2 is True ; Statement-2 is a correct explanation for Statement-1.

(B) Statement-1 is True, Statement-2 is True ; Statement-2 is NOT a correct explanation for Statement-1.

(C) Statement-1 is True, Statement-2 is False.

(D) Statement-1 is False, Statement-2 is True.

33. **Statement-1 :** According to CIP sequence rule the priority of the groups is

$-CH = CH_2 < -C \equiv CH < -C \equiv N < -CH = O$

and

Statement-2 : Priority of the given groups are based on molecular mass of groups.

(A) Statement-1 is True, Statement-2 is True ; Statement-2 is a correct explanation for Statement-1

(B) Statement-1 is True, Statement-2 is True ; Statement-2 is NOT a correct explanation for Statement-1

(C) Statement-1 is True, Statement-2 is False

(D) Statement-1 is False, Statement-2 is True

Comprehension Type :

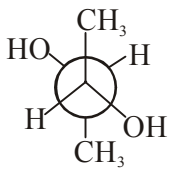
Paragraph for Q. 34 to 35

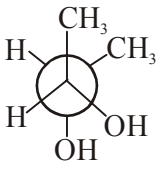
Different spatial arrangements of the atoms that result from rotation about a single bond are conformers. n-Butane has four conformers eclipsed, partial eclipsed, gauche and anti. The stability order of these conformers are as follows :

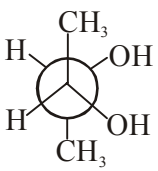
Anti > gauche > Partial eclipsed > Fully eclipsed

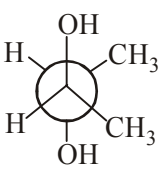
Although anti is more stable than gauche but in some cases gauche is more stable than anti.

34. Which one of the following is the most stable conformer ?

(A) 

(B) 

(C) 

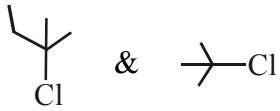
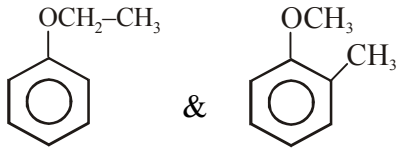
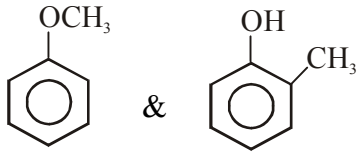
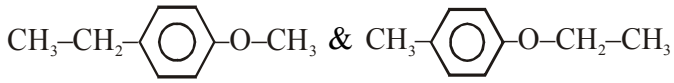
(D) 

35. Number of possible conformations of n-butane is :

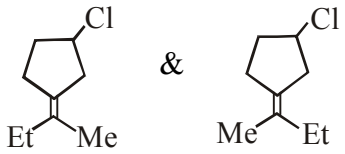
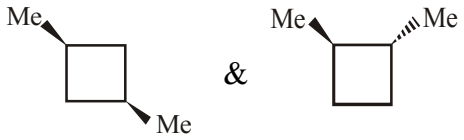
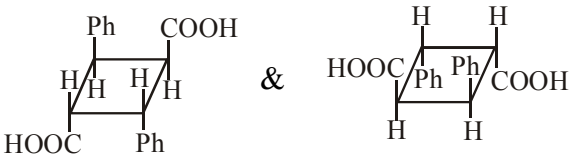
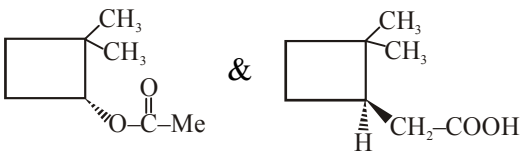
(A) 2 (B) 4 (C) 6 (D) infinite

Matrix Match Type :

36. Match the column I with column II.

Column-I (reaction)	**Column-II (stereoisomers)**
(A) 	(P) Homologs
(B) 	(Q) Functional isomers
(C) 	(R) Metamer
(D) 	(S) Position isomers

37. Match the column I with column II.

Column-I	**Column-II**
(A) 	(P) Identical
(B) 	(Q) Functional isomers
(C) 	(R) Geometrical Isomers
(D) 	(S) Positional Isomers

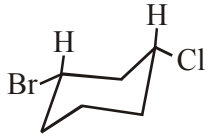
Subjective Type :

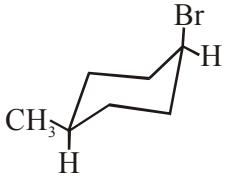
38. Considering rotation about the C_3–C_4 bond of 2-methylhexane :

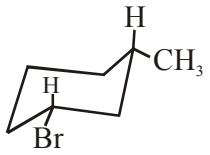
(a) Draw the Newman projection of the most stable conformer

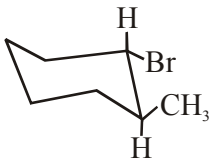
(b) Draw the Newman projection of the least stable conformer

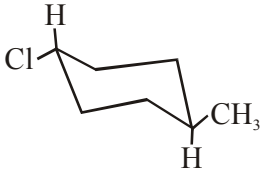
39. Determine whether each of the following compounds is a cis isomer or a trans isomer.

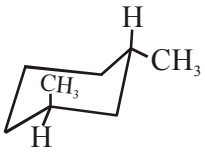
(a) 

(b) 

(c) 

(d) 

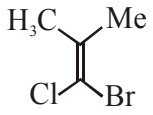
(e) 

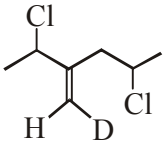
(f) 

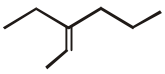
40. Draw the most stable conformer of N-methylpiperidine.

41. How many pair(s) of geometrical isomers are possible with C_6H_{12} (only in open chain structures)

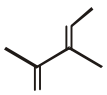
42. Identify molecules which usually can show geometrical isomerism (at room temperature):

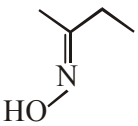
(I) 

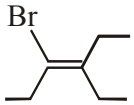
(II) 

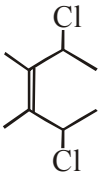
(III) 

(IV)

(V) 

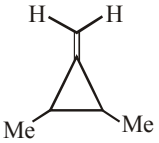
(VI) 

(VII) 

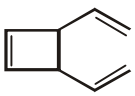
(VIII) 

(IX)

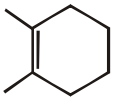
(X)

(XI) 

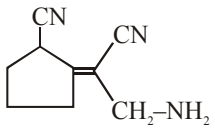
(XII)

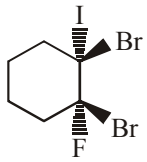
(XIII) 

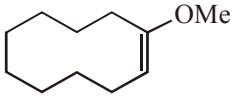
(XIV)

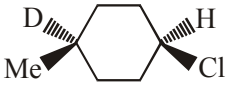
(XV) 

43. Calculate the number of Benzenoid isomers possible for C_6H_3ClBrI.

44. (a) 

(b) 

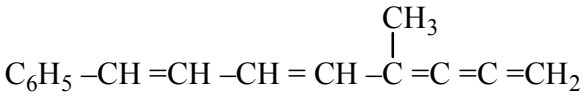
(c) 

(d) 

Assign E or Z to the following compounds and write 1 for E and 2 for Z.

Write answer of part (a), (b), (c) & (d) in the same order and present the four digit number as answer in OMR sheet. For example: If all these answer are 9 then fill 9999 in OMR sheet.

45. (a) Number of geometrical isomers of the following compound.



(b) Total number 2° and 3° Alcohols possible for $C_5H_{11}OH$. without connting stereo isomers.

Write answer of part (a) & (b) in the same order and present the four digit number as answer in OMR sheet. For example: If your Answer for (a) is 9 & (b) is 9 then fill 0909 in OMR sheet.

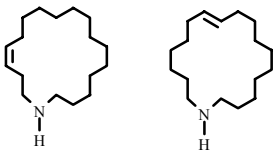
46. Analyse the following pairs of compounds.

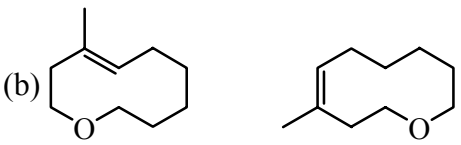
Write 1 if they are Geometrical isomers.

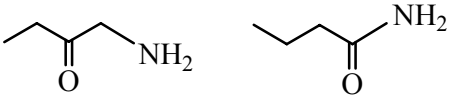
Write 2 if they are Chain isomers.

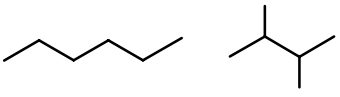
Write 3 if they are position isomers.

Write 4 if they are Functional group isomers.

(a) 

(b) 

(c) 

(D) 

Write answer of part (a), (b), (c) & (d) in the same order and present the four digit number as answer in OMR sheet. For example: If all these answers are 9 then fill 9999 in OMR sheet.

EXERCISE # I (MAINS ORIENTED)

Single Correct Type :

1. Ans. (D) **2. Ans. (A)** **3. Ans. (C)** **4. Ans. (C)** **5. Ans. (C)**

6. Ans. (C) **7. Ans. (D)** **8. Ans. (D)** **9. Ans. (A)** **10. Ans. (B)**

11. Ans. (C) **12. Ans. (A)** **13. Ans. (C)** **14. Ans. (B)** **15. Ans. (A)**

16. Ans. (D) **17. Ans. (B)** **18. Ans. (D)** **19. Ans. (C)** **20. Ans. (D)**

21. Ans. (A) **22. Ans. (B)** **23. Ans. (D)** **24. Ans. (B)** **25. Ans. (A)**

26. Ans. (B) **27. Ans. (C)**

More than one correct Type :

28. Ans. (B,C,D) **29. Ans. (A,C,D)** **30. Ans. (A,B,D)** **31. Ans. (B,C,D)**

Assertion / Reasoning Type :

32. Ans. (D) **33. Ans. (C)**

Comprehension Type :

34. Ans. (C) **35. Ans. (D)**

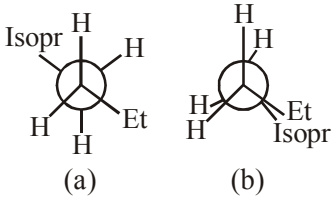
Matrix Match Type :

36. Ans. (A)→P ; (B)→R ; (C)→Q ; (D)→R

37. Ans. (A)→R ; (B)→S ; (C)→P ; (D)→Q

Subjective Type :

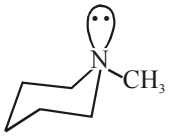
38. Ans.



(a) (b)

39. Ans. (a) cis (b) cis (c) cis (d) trans (e) trans (f) trans

40. Ans.



41. Ans. (4) **42. Ans. II, III, IV, V, VI, VIII, IX, XI, XIII, XIV,**

43. Ans. (10) **44. Ans. (2112)** **45. (a) Ans. (4) ; (b) Ans. (0404)**

46. Ans. (a) Position isomers so (3) **(b) Geometrical isomers so (1)**

(c) Functional isomers so (4) **(d) Chain isomers so (2)**